Amendments to the Claims:

The amendments are being made to the claims as originally filed. The annexed claims are not to be considered or applied. This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of providing a correction for a slave instrument, ~~of the kind~~ the slave instrument measuring properties of an object by exposing the object to electromagnetic radiation~~, in particular X-rays,~~ in at least two spectral ranges and obtaining one or more object responses thereto, the responses being based on detecting at least one of attenuation, ~~and/or~~ reflection and scattering ~~and/or scatter~~ of the electromagnetic radiation in or from ~~in/from~~ the object by use of one or more detectors, the responses ~~and are~~ obtained in a form where they express properties either directly or via a transformation, said method of correction comprising:

obtaining, for a plurality of stable objects, a set of responses comprising one or more ~~pair~~ pairs of related responses (Q_{low}^S and Q_{high}^S) representing measurements in the at least two spectral ranges performed with the slave instrument and a set of responses, comprising one or more ~~pair~~ pairs of related responses (Q_{low}^m and Q_{high}^m) representing measurements in the at least two spectral ranges performed with a master instrument[,];

wherein a pair of related responses (Q_{low}^m and Q_{high}^m) of the master instrument corresponds to each pair of related responses (Q_{low}^S and Q_{high}^S) of the slave instrument, ~~to each pair of related responses(Q_{low}^S and Q_{high}^S) of the slave instrument corresponds a pair of related responses(Q_{low}^m and Q_{high}^m) of the master instrument,~~

wherein each element in the corresponding pair of responses (Q_{low}^m and Q_{high}^m) of the master instrument corresponds to an element in each pair of responses (Q_{low}^S and Q_{high}^S) of the slave instrument~~; and to each element in each pair of responses (Q_{low}^S and Q_{high}^S) of the slave instrument corresponds an element in the corresponding pair of responses (Q_{low}^m and Q_{high}^m) of the master instrument;~~

determining, based on the sets of responses, a correcting function, the correcting function being a functional relationship between a ratio of related responses of the master instrument and a sum of a plurality of terms, each term being a product of a correcting coefficient (B_i) and powers of related responses (Q_{low}^S and Q_{high}^S) of the slave instrument, wherein each response is ~~being~~ raised to a power being a positive or negative real number, or zero, thereby determining a first set of correcting coefficients (B_0; B_1; B_2 . . .) being multiplied by respective of ~~on~~ each of the terms; and

storing the first set of correcting coefficients (B_0; B_1; B_2 . . .) in a memory means included in or adapted for communication with a data processing unit ~~means~~ included in or adapted for communication with the slave instrument.

2. (Currently Amended) ~~A~~ The method according to claim 1, wherein the electromagnetic radiation comprises X-rays. ~~wherein, initially, at a manufactures site~~

~~measuring the plurality of stable objects on a master instrument, thereby obtaining the set of responses representing measurements performed with the master instrument (Q_{low}^m and Q_{high}^m),~~

~~storing the set of responses (Q_{low}^m and Q_{high}^m) as a set of constant values in memory means, which is accessible from a slave instrument, when measuring the corresponding stable objects on a slave instrument in order to carry out a method of providing a correcting according to claim 1~~

3. (Currently Amended) ~~A method according to claim 2, wherein the set of responses measured by the master instrument is stored in memory means included in or adapted for communication with data processing means included in or adapted for communication with the slave instrument~~ The method according to claim 1, further comprising:

initially measuring at a manufacturing site the plurality of stable objects on the master instrument, thereby obtaining the set of responses representing measurements performed with the master instrument (Q_{low}^m and Q_{high}^m);

initially storing at the manufacturing site the set of responses (Q_{low}^m and Q_{high}^m) initially measured as a set of constant values in the memory, the memory being accessible from the slave instrument, when measuring the corresponding stable objects on a slave instrument.

4. (Currently Amended) A The method according to claim 1, ~~2 or 3,~~ wherein the determination of the correcting function is being based on a regression method.

5. (Currently Amended) ~~A~~ The method according to claim 4, wherein the regression method is selected from the group consisting of principal component regression, multiple linear regression, partial least squares regression, and artificial neural networks.

6. (Currently Amended) ~~A~~ The method according to claim 1, ~~any of the preceding claims,~~ wherein the correcting function comprises a plurality of terms of the following form: $Q_{low}^{n1} * Q_{high}^{m1}$, wherein n1 and m1 are selected from the group consisting of real numbers and ~~and/or~~ integers, and n1 is positive.

7. (Currently Amended) The ~~A~~ method according to claim 6, wherein the correcting function comprises at least three of the following terms: Q_{low}, Q_{high}, Q_{low}^2, Q_{high}^2 and Q_{low}/Q_{high}.

8. (Currently Amended) The ~~A~~ method according to claim 6, wherein the correcting function comprises at least three of the following terms: $Q_{low} * Q_{high}$; $Q_{low}^2 * Q_{high}$; $Q_{low} * Q_{high}^2$; Q_{low}^2/Q_{high}; Q_{low}/Q_{high}^2; Q_{low}^2/Q_{high}^2; and Q_{low}^2/Q_{high}^2.

9. <u>The</u> ~~A~~ method according to <u>claim 1</u> ~~any of the preceding claims~~, wherein the correcting function is of the form:

$$\frac{Q_{low}^{m}}{Q_{high}^{m}} = B_1 Q_{low}^{s} + B_2 Q_{high}^{s} + B_3 {Q_{low}^{s}}^2 + B_4 {Q_{high}^{s}}^2 + B_5 Q_{low}^{s} Q_{high}^{s} + B_6 {Q_{low}^{s}}^2 Q_{high}^{s} + B_7 Q_{low}^{s} {Q_{high}^{s}}^2$$

$$+ B_8 \frac{Q_{low}^{s}}{Q_{high}^{s}} + B_9 \frac{{Q_{low}^{s}}^2}{Q_{high}^{s}} + B_{10} \frac{Q_{low}^{s}}{{Q_{high}^{s}}^2} + B_{11} \left[\frac{Q_{low}^{s}}{Q_{high}^{s}}\right]^2 + B_0$$

<u>wherein the Bs are constants.</u>

10. (Currently Amended) <u>The</u> ~~A~~ method according to <u>claim 1</u> ~~any of the preceding claims~~, further comprising<u>:</u>

determining<u>,</u> based on the sets of responses<u>,</u> a further correcting function<u>,</u> ~~the further correction function~~ being a functional relationship between responses of the slave instrument (Q_{low}^{S} or Q_{high}^{S}) and related responses (Q_{low}^{m} or Q_{high}^{m}) of the master instrument, thereby determining a second set of correcting coefficients, ~~(α;β)~~ <u>α and β</u>.

11. (Currently Amended) <u>The</u> ~~A~~ method according to claim 10, wherein the further correcting function <u>is</u> ~~being~~ a functional relationship between a high energy response of the slave instrument (Q_{high}^{S}) and the related high energy response (Q_{high}^{m}) of the master instrument.

12. (Currently Amended) ~~A~~ <u>The</u> method according to claim 11, wherein the further correcting function is determined by use of univariate linear regression.

13. (Currently Amended) ~~A~~ <u>The</u> method according to claim 12, wherein the further correcting function <u>is</u> ~~being~~ of the form $Q_{high}^{m} = \alpha \cdot Q_{high}^{S} + \beta$.

14. (Currently Amended) ~~A~~ <u>The</u> method according to <u>claim 1</u> ~~any of the preceding claims~~, wherein the set of responses for the master instrument and the set of responses for the slave instrument each comprise one pair of related responses for each stable object comprised in the plurality of stable objects.

15. (Currently Amended) ~~A~~ The method according to claim 1 ~~any of the preceding claims~~, wherein the related responses are obtained based on ~~measuring~~ measurements on objects being conveyed.

16. (Currently Amended) ~~A~~ The method according to claim 1 ~~any of the preceding claims~~, wherein each of the responses (Q) is an intensity (I)~~, if necessary corrected with respect to dark current of the detectors~~.

17. (Currently Amended) ~~A~~ The method according to claim 1 ~~any of the claims 1-15~~, wherein each of the responses ~~is a transmittance (T) being derived from intensity as a ratio between intensity resulting from measuring on an object and reference intensity~~ (Q) is an intensity (I) corrected with respect to dark current of the detectors.

18. (Currently Amended) ~~A~~ The method according to claim 1 ~~any of the claims 1-15~~, wherein each of the responses is ~~an absorbance being defined as the negative logarithm to a transmittance (A=-log(T)) such as logarithm base 10, the natural logarithm, or any other logarithmic function~~ a transmittance (T) being a ratio between an intensity resulting from measuring an object and a reference intensity.

19. (Currently Amended) ~~A~~ The method according to claim 1 ~~any of the claims 1-15~~, wherein each of ~~the~~ responses ~~for both the master and the slave instruments are absorbances being determined by calculating~~

$$\cancel{A_{low} = \log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}}$$

$$\cancel{A_{high} = \log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]}$$

~~wherein the intensities (I) are obtained in a measuring region of the master instrument respectively the slave instrument by:~~

002.1227704.1

~~——exposing the object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high) respectively~~

~~——detecting the intensities I_{dark}(low) and I_{dark}(high) from said detectors when no radiation reaches them;~~

~~and~~

~~——exposing said detectors to the low and high X-ray energies signals when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high)~~

is an absorbance, A, being defined as the negative logarithm to a transmittance, T, (A=-log(T)).

20. (Currently Amended) ~~A~~ The method according to ~~any one of claims 1-15~~ claim 19, wherein ~~each of the responses is a reflectance (R) expressing the reflectance from the surface of the object~~ the logarithm is one of a logarithm base 10 and a natural logarithm.

21. (Currently Amended) ~~A~~ The method according to claim ~~19~~ 1, wherein the ~~reflectance (R) is linearized, preferably using the Kubelka-Munk transform (K/S=(1-R)/2R)~~ responses for both the master and the slave instruments are absorbances, A_{low} and A_{high}, being determined by calculating

$$A_{low} = -\log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}$$

$$A_{high} = -\log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]$$

wherein I_{sample} is the intensity of the radiation detected when the object is irradiated, I_{dark} is the intensity of the radiation detected when the object is not irradiated, and I_{air} is the intensity of the radiation detected when no object is present, the intensities obtained in a measuring region in respective of the master instrument and the slave instrument by:

exposing the object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high), respectively;

detecting the intensities I_{dark}(low) and I_{dark}(high) from said detectors when no radiation reaches them; and

exposing said detectors to the low and high X-ray energies when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high), respectively.

22. (Currently Amended) ~~A~~ The method according to claim 1, wherein each of the responses is a reflectance (R) expressing the reflectance from the surface of a respective of the objects. ~~of correcting responses representing measurements performed with a slave instrument, said method comprising for an object~~

~~determining based on measurements with the slave instrument a pair of related responses (Q_{low}^S and Q_{high}^S),~~

~~determining the ratio $[Q_{low}/Q_{high}]^{corr}$ by a correcting function being a functional relationship between a ratio of related responses of the master instrument and a sum of a plurality of terms, each term being a product of a correcting coefficient (B_1) and powers of related responses (Q_{low}^S and Q_{high}^S of the slave instrument wherein each response being raised to a power being a positive or negative real number, or zero,~~

~~providing Q_{high}^{corr} either by assuming that Q_{high}^{corr} is substantially equal to Q_{high}^S or by use of a further correcting function correlating Q_{high}^{corr} with Q_{high}^S;~~

~~and~~

~~calculating Q_{low}^{corr} as $Q_{high}^{corr} * [Q_{low}/Q_{high}]^{Corr}$;~~

~~thereby providing a set of corrected responses.~~

23. (Currently Amended) ~~A~~ The method according to claim 22, wherein the ~~further correcting function being of the form $Q_{high}^{corr} = \alpha \cdot Q_{high}^S + \beta$~~ reflectance (R) is linearized, using the Kubelka-Munk transform (K/S=(1-R)/2R).

24. (Currently Amended) A method ~~according to claim 22 or 23, wherein the correcting function comprises terms of the following form $Q_{low}^{n1} * Q_{high}^{m1}$, wherein n1 and m2 are real numbers~~

002.1227704.1

~~and/or integers, and wherein n1 is positive~~ of correcting responses representing measurements for an object performed with a slave instrument, said method comprising:

determining, based on measurements with the slave instrument, a pair of related responses (Q_{low}^S and Q_{high}^S);

determining a ratio $[Q_{low}/Q_{high}]^{corr}$ using a correcting function, the correcting function being a functional relationship between a ratio of related responses of a master instrument and a sum of a plurality of terms, each term of the plurality of terms being a product of a correcting coefficient (B_i) and powers of related responses (Q_{low}^S and Q_{high}^S) of the slave instrument, wherein each response is raised to a power being a positive or negative real number, or zero;

providing Q_{high}^{corr}, where Q_{high}^{corr} is substantially equal to Q_{high}^S, or Q_{high}^{corr} is determined using a further correcting function correlating Q_{high}^{corr} with Q_{high}^S; and

calculating Q_{low}^{corr} as equal to Q_{high}^{corr} * $[Q_{low}/Q_{high}]^{corr}$, and thereby providing a set of corrected responses.

25.(Currently Amended) ~~A~~ The method according to ~~any of the claims 22-24~~ claim 24, wherein the further correcting function ~~comprises at least three of the following terms: Q_{low}, Q_{high}, Q_{low}^2, Q_{high}^2 and Q_{low}/Q_{high}~~ is of the form: $Q_{high}^{corr} = \alpha \cdot Q_{high}^S + \beta$.

26. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-25~~ claim 24, wherein the correcting function comprises ~~at least three of the following terms: $Q_{low} \cdot Q_{high}$; $Q_{low}^2 * Q_{high}$; $Q_{low} * Q_{high}^2$; Q_{low}^2/Q_{high}; Q_{low}/Q_{high}^2; Q_{low}^2/Q_{high}^2; Q_{low}^2/Q_{high}^2~~ terms of the following form: Q_{low}^{n1} * Q_{high}^{m1}, wherein n1 and m1 are one of real numbers and integers, and wherein n1 is positive.

27. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-26~~ claim 24, wherein the correcting function ~~is of the form:~~

$$\cancel{\left[\frac{Q_{low}}{Q_{high}}\right]^{corr} = B_1 Q_{low}^s + B_2 Q_{high}^s + B_3 {Q_{low}^s}^2 + B_4 {Q_{high}^s}^2 + B_5 Q_{low}^s Q_{high}^s + B_6 {Q_{low}^s}^2 Q_{high}^s + B_7 Q_{low}^s {Q_{high}^s}^2}$$

$$\cancel{+ B_8 \frac{Q_{low}^s}{Q_{high}^s} + B_9 \frac{{Q_{low}^s}^2}{Q_{high}^s} + B_{10} \frac{Q_{low}^s}{{Q_{high}^s}^2} + B_{11}\left[\frac{Q_{low}^s}{Q_{high}^s}\right]^2 + B_0}$$

comprises at least three of the following terms: Q_{low}, Q_{high}, Q_{low}^2, Q_{high}^2 and Q_{low}/Q_{high}.

28. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-27~~ claim 24, wherein ~~each of the responses (Q) is an intensity (I), if necessary corrected with respect to dark current of the detectors~~ the correcting function comprising at least three of the following terms: $Q_{low} \cdot Q_{high}$; $Q_{low}^2 * Q_{high}$; $Q_{low} * Q_{high}^2$; Q_{low}^2/Q_{high}; Q_{low}/Q_{high}^2; Q_{low}^2/Q_{high}^2; and Q_{low}^2/Q_{high}^2.

29. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-27~~ claim 24, wherein ~~each of the responses is a transmittance (T) being derived from intensity as a ratio between intensity resulting from measuring on an object and a reference intensity~~ the correcting function is of the form:

$$\left[\frac{Q_{low}}{Q_{high}}\right]^{corr} = B_1 Q^s_{low} + B_2 Q^s_{high} + B_3 {Q^s_{low}}^2 + B_4 {Q^s_{high}}^2 + B_5 Q^s_{low} Q^s_{high} + B_6 {Q^s_{low}}^2 Q^s_{high} + B_7 Q^s_{low} {Q^s_{high}}^2$$

$$+ B_8 \frac{Q^s_{low}}{Q^s_{high}} + B_9 \frac{{Q^s_{low}}^2}{Q^s_{high}} + B_{10} \frac{Q^s_{low}}{{Q^s_{high}}^2} + B_{11} \left[\frac{Q^s_{low}}{Q^s_{high}}\right]^2 + B_0$$

wherein the Bs are constants.

30. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-27~~ claim 24, wherein each of ~~responses is an absorbance being defined as the negative logarithm to a transmittance (A=-log(T)) such as logarithm base 10, the natural logarithm, or any other logarithmic function~~ the responses (Q) is an intensity (I).

31. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-27~~ claim 24, wherein each of the responses ~~are absorbances being determined by calculating~~

$$\cancel{A_{low} = -\log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{ and}}$$

$$\cancel{A_{high} = -\log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]}$$

~~wherein the intensities (I) are obtained in a measuring region of the slave instrument by:~~

~~exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high) respectively~~

~~detecting with the detectors the intensities I_{dark}(low)) and I_{dark}(high) from said detectors when no radiation reaches them;~~

~~and~~

~~exposing said detectors to the low and high X-ray energies signals when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high)~~ (Q) is an intensity (I) corrected with respect to dark current of the detectors.

32. (Currently Amended) ~~A~~ The method according to ~~any of the claims 22-27~~ claim 24, wherein each of the responses is a ~~reflectance (R) expressing the reflectance from the surface of the object~~ transmittance (T) being a ratio between intensity resulting from measuring an object and a reference intensity.

33. (Currently Amended) ~~A~~ The method according to claim ~~32~~ 24, wherein ~~the reflectance (R) is linearized, preferably using the Kubelka-Munk transform (K/S=(1-R)/2R)~~ each of responses is an absorbance, A, defined as the negative logarithm to a transmittance, T, (A=-log(T)).

34. (Currently Amended) ~~A~~ The method according to ~~any of the preceding claims~~ claim 33, wherein the ~~correcting function and the further correcting function being determined by the method according to any of the claims 1-21~~ logarithm is one of a logarithm base 10, and a natural logarithm.

35. (Currently Amended) ~~A~~ The method ~~of determining a physical quantity for an object by a slave instrument, the method comprising~~

~~determining for the object corrected high and low energy responses (Q_{high}^{corr} and Q_{low}^{corr} by utilizing the method according to any of the claims 22-34,~~

~~determining the physical quantity by applying on said corrected responses a calibrated functional relationship between Q_{high}^{corr} and Q_{low}^{corr} and a physical quantity~~ according to claim 24, wherein the responses are absorbances being determined by calculating

$$A_{low} = -\log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}$$

$$A_{high} = -\log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right],$$

wherein I_{sample} is the intensity of the radiation detected when the object is irradiated, I_{dark} is the intensity of the radiation detected when the object is not irradiated, and I_{air} is the intensity of the radiation detected when no object is present, the intensities obtained in a measuring region of the slave instrument by:

exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high), respectively;

detecting with the detectors the intensities I_{dark}(low)) and I_{dark}(high) from said detectors when no radiation reaches them; and

exposing said detectors to the low and high X-ray energies when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high), respectively.

36. (Currently Amended) ~~A~~ The method according to claim ~~35~~ 24, wherein ~~the calibrated functional relationship being a functional relationship between a physical quantity and a sum of a plurality of terms, each term being a product of a calibration coefficient (B_1) and powers of related responses (Q_{low}^S and Q_{high}^S), wherein each response being raised to a power being a positive or negative real number, or zero~~ each of the responses is a reflectance (R) expressing the reflectance from the surface of a respective of the objects.

37. (Currently Amended) ~~A~~ The method according to claim 36, wherein the ~~calibrated functional relationship comprises terms being of the form: $Q_{low}^{n1} * Q_{high}^{m1}$ wherein n1 and m2 are real numbers and/or integers, and wherein n1 is positive, such as comprises terms being of the form: Q_{low}, Q_{high}, Q_{low}^2, Q_{high}^2 and Q_{low}/Q_{high}, preferably comprises terms of the form: Q_{low}; Q_{high}; $Q_{low}^2 * Q_{high}$; Q_{low} *~~

~~Q_{high}^2; Q_{low}^2/Q_{high}; Q_{low}/Q_{high}^2; Q_{low}^2/Q_{high}^2; Q_{low}^2/Q_{high}^2~~ reflectance (R) is linearized using the Kubelka-Munk transform (K/S=(1-R)/2R).

38. (Currently Amended) A method ~~according to claim 37, wherein the calibrated functional relationship is of the form:~~

$$\cancel{F(Q)=B_1Q_{low}^s+B_2Q_{high}^s+B_3{Q_{low}^s}^2+B_4{Q_{high}^s}^2+B_5Q_{low}^sQ_{high}^s+B_6{Q_{low}^s}^2Q_{high}^s+B_7Q_{low}^s{Q_{high}^s}^2}$$
$$\cancel{+B_8\frac{Q_{low}^s}{Q_{high}^s}+B_9\frac{{Q_{low}^s}^2}{Q_{high}^s}+B_{10}\frac{Q_{low}^s}{{Q_{high}^s}^2}+B_{11}\left[\frac{Q_{low}^s}{Q_{high}^s}\right]^2+B_0}$$

of determining a physical quantity for an object by a slave instrument, the method comprising:

determining for the object corrected high and low energy responses (Q_{high}^{corr} and Q_{low}^{corr}) using the method according to claim 24; and

determining the physical quantity by applying a calibrated functional relationship between Q_{high}^{corr} and Q_{low}^{corr} and a physical quantity on said corrected responses.

39. (Currently Amended) ~~A~~ The method according to claim 38 ~~any of claims 35-38~~, wherein the ~~calibration model is obtained by exposing the master instrument to a plurality of well-defined objects~~ calibrated functional relationship is a functional relationship between a physical quantity and a sum of a plurality of terms, each term being a product of a calibration coefficient (B_i) and powers of related responses (Q_{low}^S and Q_{high}^S), wherein each response is raised to a power being a positive or negative real number, or zero.

40. (Currently Amended) ~~A~~ The method according to claim 39, wherein the ~~well defined objects are defined in the sense that the physical properties of the object have been established by a chemical process, such as an officially recognized reference method for the determination of the requested physical property~~ calibrated functional relationship comprises terms of the form: Q_{low}^{n1} * Q_{high}^{m1}, wherein n1 and m1 are at least one of real numbers and integers, and wherein n1 is positive.

41. (Currently Amended) ~~A~~ The method according to ~~any of the claims 35-40, wherein each of the responses (Q) is either:~~

~~– an intensity (I), if necessary corrected with respect to dark current of the detectors;~~

~~– a transmittance (T) being derived from intensity as a ratio between intensity resulting from measuring on an object and a reference intensity;~~

~~– an absorbance being defined as the negative logarithm to a transmittance (A=- log(T)) such as logarithm base 10, the natural logarithm, or any other logarithmic function;~~

~~or~~

~~– a reflectance (R) expressing the reflectance from the surface of the object, the reflectance (R) is preferably linearized using the Kubelka Munk transform (K/S=(l-R)/2R)~~ claim 40, wherein the calibrated functional relationship comprises terms of the form: Q_{low}, Q_{high}, Q_{low}^2, Q_{high}^2 and Q_{low}/Q_{high}.

42. (Currently Amended) ~~A~~ The method according to claim ~~41~~ 40, wherein~~; in case the responses are absorbances, the absorbances being determined by calculating~~

$$\cancel{A_{low} = -\log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{ and}}$$

$$\cancel{A_{high} = -\log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]}$$

~~wherein the intensities (I) are obtained in a measuring region of the slave instrument by:~~

~~– exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high) respectively~~

~~– detecting with the detectors the intensities I_{dark}(low) and I_{dark}(high) from said detectors when no radiation reaches them;~~

~~and~~

~~——exposing said detectors to the low and high X-ray energies signals when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high)~~ the calibrated functional relationship comprises terms of the form: $Q_{low} \cdot Q_{high}$; $Q_{low}^2 * Q_{high}$; $Q_{low} * Q_{high}^2$, Q_{low}^2/Q_{high}; Q_{low}/Q_{high}^2; Q_{low}^2/Q_{high}^2; and Q_{low}^2/Q_{high}^2.

43. (Currently Amended) ~~A~~ The method ~~of using a slave instrument for determining physical quantities, such as the fat content, of an object, such as food or feed, by use of dual X-ray radiation, said method comprising-~~

~~——scanning substantially all or all of the object by X-ray beams having at least two energy levels, including a low level and a level being higher relatively thereto,~~

~~——detecting the X-ray beams having passed through the object for a plurality of areas of the object;~~

~~——for each area of the object~~

~~——determining the object's response (Q_{low}) at the low energy level and the object's response (Q_{high}) at the high energy level,~~

~~——correcting the responses so determined by utilising the correcting method according to any of the claims 22-34,~~

~~and~~

~~——determining the physical property by utilizing the method according to claims 35- 42~~ according to claim 40, wherein the calibrated functional relationship is of the form:

$$F(Q) = B_1 Q^s_{low} + B_2 Q^s_{high} + B_3 {Q^s_{low}}^2 + B_4 {Q^s_{high}}^2 + B_5 Q^s_{low} Q^s_{high} + B_6 {Q^s_{low}}^2 Q^s_{high} + B_7 Q^s_{low} {Q^s_{high}}^2$$

$$+ B_8 \frac{Q^s_{low}}{Q^s_{high}} + B_9 \frac{{Q^s_{low}}^2}{Q^s_{high}} + B_{10} \frac{Q^s_{low}}{{Q^s_{high}}^2} + B_{11} \left[\frac{Q^s_{low}}{Q^s_{high}} \right]^2 + B_0$$

wherein the Bs are constants.

44. (Currently Amended) ~~A data processing system for providing a correction for a slave instrument, said system utilizes sets of responses being based on detecting attenuation and/or reflection and/or scatter of electromagnetic radiation, in particular X-ray, in/from a object exposed to said electromagnetic radiation in at least two spectral ranges, the set of responses comprises one or more pair of related responses (Q_{low}^{S} and Q_{high}^{S}) representing measurements performed with a slave instrument and a set of responses comprising one or more pair of related responses (Q_{low}^{m} and Q_{high}^{m}) representing measurements performed with a master instrument, said responses being obtained for a plurality of - stable objects and~~

~~——— to each pair of related responses of the slave instrument corresponds a pair of related responses of the master instrument,~~

~~——— and to each element in each pair of responses of the slave instrument corresponds an element in the corresponding pair of responses of the master instrument;~~

~~said data processing system comprising~~

~~——— means for accessing memory means wherein the responses (Q_{low}^{m} and Q_{high}^{m}) of the master instrument and/or the responses (Q_{low}^{S} and Q_{high}^{S}) of the slave instrument are stored,~~

~~——— means, such as processor means, for determining based on the sets of responses a correcting function being a functional relationship between a ratio of related responses of the master instrument and a sum of a plurality of terms, each term being a product of a correcting coefficient (B_1) and powers of related responses (Q_{low}^{S} and Q_{high}^{S}) of the slave instrument wherein each response being raised to a power being a positive or negative real number, or zero, thereby determining a first set of correcting coefficients (B_0; B_1; B_2 .....) being multiplied on each of the terms,~~

~~——— means for storing the first set of correction coefficients (B_0; B_1; B_2 .....)~~ The method according to claim 38, wherein the calibration model is obtained by exposing the master instrument to a plurality of well-defined objects.

002.1227704.1

45. (Currently Amended) ~~A data processing system according to claim 44, further comprising means for determining a further correcting function being a functional relationship between a high energy response of the slave instrument (Q_{high}^{S}) and related high energy response (Q_{high}^{m}) of the master instrument, thereby determining a second set of correcting coefficients (α; β)~~ The method according to claim 44, wherein the well-defined objects are defined such that physical properties of the objects have been established by a chemical process.

46. (Currently Amended) ~~A data-processing system according to claim 44 or 45, wherein each of the responses (Q) is either:~~

~~——— an intensity (I), if necessary corrected with respect to dark current of the detectors;~~

~~——— a transmittance (T) being derived from intensity as a ratio between intensity resulting from measuring on an object and reference intensity;~~

~~——— an absorbance being defined as the negative logarithm to a transmittance.(A=-log(T)) such as logarithm base 10, the natural logarithm, or any other logarithmic function;~~

~~or~~

~~——— a reflectance (R) expressing the reflectance from the surface of the object, the reflectance (R) is preferably linearized using the Kubelka-Munk transform (K/S=(1-R)/2R)~~ The method according to claim 45, wherein the chemical process is an officially recognized reference method for the determination of the physical properties.

47. (Currently Amended) ~~A data processing system according to claim 46, wherein, in case the responses are absorbances, the absorbances being determined by calculating~~

$$\cancel{A_{low} = \log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}}$$

$$\cancel{A_{high} = \log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]}$$

~~wherein the intensities (I) are obtained in a measuring region of the slave instrument by:~~

~~exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities~~ ~~$I_{sample}(low)$~~ ~~and~~ ~~$I_{sample}(high)$~~ ~~respectively~~

~~detecting with the detectors the intensities~~ ~~$I_{dark}(low)$~~ ~~and~~ ~~$I_{dark}(high)$~~ ~~from said detectors when no radiation reaches them;~~

~~and~~

~~exposing said detectors to the low and high X-ray energies signals when no object is present in the measuring region and detecting~~ ~~$I_{air}(low)$~~ ~~and~~ ~~$I_{air}(high)$~~ The method according to claim 38, wherein each of the responses (Q) is one of:

an intensity (I);

a transmittance (T) derived as a ratio between intensity resulting from measuring an object and a reference intensity;

an absorbance defined as the negative logarithm to a transmittance (A=- log(T)); and

a reflectance (R) expressing the reflectance from the surface of an object, the reflectance (R) being linearized using the Kubelka-Munk transform (K/S=(l-R)/2R).

48. (Currently Amended) ~~A data processing system according to claim 46, wherein, in case the responses are absorbances, the absorbances being determined by calculating~~

$$\cancel{A_{low} = \log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}}$$

$$\cancel{A_{high} = \log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]}$$

~~wherein the intensities (I) are obtained in a measuring region of the slave instrument by:~~

~~exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high) respectively~~

~~detecting with the detectors the intensities I_{dark}(low) and I_{dark}(high) from said detectors when no radiation reaches them;~~

~~and~~

~~exposing said detectors to the low and high X-ray energies signals when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high)~~ The method according to claim 47, wherein, the responses are absorbances, the absorbances being determined by calculating

$$A_{low} = -\log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}$$

$$A_{high} = -\log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right],$$

wherein I_{sample} is the intensity of the radiation detected when the object is irradiated, I_{dark} is the intensity of the radiation detected when the object is not irradiated, and I_{air} is the intensity of the radiation detected when no object is present, the intensities obtained in a measuring region of the slave instrument by:

exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high), respectively;

detecting with the detectors the intensities I_{dark}(low) and I_{dark}(high) from said detectors when no radiation reaches them; and

exposing said detectors to the low and high X-ray energies when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high), respectively.

49. (Currently Amended) ~~A system according to claim 48, wherein each of the responses (Q) is either:~~

002.1227704.1

~~an intensity (I), if necessary corrected with respect to dark current of the detectors;~~

~~a transmittance (T) being derived from intensity as a ratio between intensity resulting from measuring on an object and reference intensity;~~

~~an absorbance being defined as the negative logarithm to a transmittance (A=-log(T)) such as logarithm base 10, the natural logarithm, or any other logarithmic function;~~

~~or~~

~~a reflectance (R) expressing the reflectance from the surface of the object, the reflectance (R) is preferably linearized using the Kubelka Munk transform (K/S=(1-R)/2R)~~ A method of using a slave instrument for determining physical quantities of an object by use of dual X-ray radiation, the method comprising:

scanning substantially all or all of the object using X-ray beams having at least two energy levels, the at least two energy levels including a low energy level and a high energy level, the high energy level being higher relatively to the low energy level;

detecting the X-ray beams having passed through the object for a plurality of areas of the object;

determining, for each area of the object, the object's response (Q_{low}) at the low energy level and the object's response (Q_{high}) at the high energy level;

correcting the responses so determined using the correcting method according to claim 24; and

determining the physical quantity by applying a calibrated functional relationship between Q_{high}^{corr} and Q_{low}^{corr} and a physical quantity on said corrected responses.

50. (Currently Amended) ~~A system according to any of the claims 44-49, further comprising storage means wherein a set of responses (Q_{low}^{m} and Q_{high}^{m}) for a set of stable objects measured on a master instrument are stored and/or storage means wherein the first set of correction~~

~~coefficients (B_0; B_1, B_2 .....) and/or the further correcting function is stored~~ The method according to claim 49, wherein the physical quantity is fat content.

51. (Currently Amended) ~~A dual X-ray instrument comprising a system according to any of the claims 44-50 adapted to carry out a method according to any of the claims 1-35~~ The method according to claim 49, wherein the object is at least one of food and feed.

52. (Currently Amended) A ~~set comprising one or more stable objects for, or used during, carrying out a method according to any of the claims 1-21, each object being characterized by being composed by at least two different chemical compositions which are substantially stable and each stable object is having response, such as absorbance, properties which are similar to the response, such as absorbance, properties of an object subjected to the method according to any of the claims 22-35~~ data processing system for providing a correction for a slave instrument, said system using sets of responses based on detecting at least one of attenuation, reflection and scattering of electromagnetic radiation in or from an object exposed to said electromagnetic radiation in at least two spectral ranges, the set of responses comprising one or more pairs of related responses (Q_{low}^S and Q_{high}^S) representing measurements performed with the slave instrument and a set of responses comprising one or more pairs of related responses (Q_{low}^m and Q_{high}^m) representing measurements performed with a master instrument, said responses being obtained for a plurality of stable objects, wherein each pair of related responses of the master instrument corresponds to a respective pair of related responses of the slave instrument, wherein each element in the corresponding pair of responses of the master instrument corresponds to a respective element in each pair of responses of the slave instrument, said data processing system comprising:

an accessing unit configured to access a memory, wherein the responses (Q_{low}^m and Q_{high}^m) of the master instrument and/or the responses (Q_{low}^S and Q_{high}^S) of the slave instrument are stored;

a processor configured to determine, based on the sets of responses, a correcting function, the correcting function being a functional relationship between a ratio of related responses of the master instrument and a sum of a plurality of terms, each term being a product of a correcting coefficient (B_i) and powers of related responses (Q_{low}^S and Q_{high}^S) of the slave instrument wherein each response is raised to a power being a positive or negative real number, or zero, thereby determining a first set of correcting coefficients (B_0; B_1; B_2 . . .) being multiplied by each of the terms; and

a storage unit configured to store the first set of correction coefficients (B_0; B_1; B_2 . . .).

53. (Currently Amended) ~~A set of stable objects according to claim 52, wherein for each of the stable object a first member of the at least two different chemical compositions is one having X-ray response properties, such as absorbance properties, similar to adipose tissue, and a second member of the at least two different chemical compositions is one having X-ray response, such as absorbance, properties similar to muscle tissue~~ The data processing system according to claim 52, wherein the electromagnetic radiation comprises rays.

54. (Currently Amended) ~~A set of stable objects according to claims 52 or 53, comprising a plurality of stable objects have varying thickness and/or areal density~~ The data processing system according to claim 52, further comprising:

a processor configured to determine a further correcting function, the further correcting function being a functional relationship between a high energy response of the slave instrument (Q_{high}^{S}) and related high energy response (Q_{high}^{m}) of the master instrument, thereby determining a second set of correcting coefficients, α and β.

55. (Currently Amended) ~~A set of stable objects according to claim 54, wherein the plurality of stable objects being integrated into a single stepped item~~ The data processing system according to claim 52, wherein each of the responses (Q) is one of:

an intensity (I);

a transmittance (T) derived from intensity as a ratio between intensity resulting from measuring an object and a reference intensity;

an absorbance, A, being defined as the negative logarithm to a transmittance, T, (A=-log(T)); and

a reflectance (R) expressing the reflectance from the surface of an object, the reflectance (R) being linearized using the Kubelka-Munk transform (K/S=(1-R)/2R).

56. (Currently Amended) ~~A set of stable objects according to any of the claims 52-55, wherein each object comprised in the set of objects is stable in the sense that the X-ray response, such as absorption, properties of the object does not change more than 0.1 %, such as no more than 0.01~~

~~%, such as no more than .0.001% within at least 10 days, such as at least 1 month, preferably at least 1 year~~ A data processing system according to claim 55, wherein the responses are absorbances, the absorbances being determined by calculating

$$A_{low} = -\log_{10}\left[\frac{I_{sample}(low) - I_{dark}(low)}{I_{air}(low) - I_{dark}(low)}\right] \text{and}$$

$$A_{high} = -\log_{10}\left[\frac{I_{sample}(high) - I_{dark}(high)}{I_{air}(high) - I_{dark}(high)}\right]$$

wherein I_{sample} is the intensity of the radiation detected when the object is irradiated, I_{dark} is the intensity of the radiation detected when the object is not irradiated, and I_{air} is the intensity of the radiation detected when no object is present, the intensities obtained in a measuring region of the slave instrument by:

exposing an object in the measuring region to low and high X-ray energies and detecting with detectors the intensities I_{sample}(low) and I_{sample}(high), respectively;

detecting with the detectors the intensities I_{dark}(low) and I_{dark}(high) from said detectors when no radiation reaches them; and

exposing said detectors to the low and high X-ray energies when no object is present in the measuring region and detecting I_{air}(low) and I_{air}(high), respectively.

57. (Currently Amended) ~~A plurality of stable objects according to any of the claims 52-56, wherein the number of stable objects in the set of stable objects are at least 8, such as at least 12, preferably at least 15, or even at least 20, such as at least 26~~ A correcting system comprising a slave instrument for obtaining responses and a data processing system for correcting the responses, the responses representing measurements performed with the slave instrument and the responses based on detecting by the slave instrument at least one of attenuation, reflection and scattering of electromagnetic radiation in or from an object exposed to said electromagnetic radiation in at least two spectral ranges, the set of responses comprises one or more pairs of related responses (Q_{low}^S and Q_{high}^S), said correcting system comprising:

a first processor means for determining the one or more pairs of related responses (Q_{low}^S and Q_{high}^S) based on measurements on an object with the slave instrument;

a second processor means for performing a correction of responses using a correction according to claim 24, said second processor means comprising an accessing unit configured to access a memory storing a first set of correction coefficients (B_0; B_1; B_2 . . .);

a third processor means for determining the ratio $[Q_{low}/Q_{high}]^{corr}$ by the correcting function;

a fourth processor means for determining the corrected high energy response Q_{high}^{corr} by the further correcting function; and

a fifth processor means for determining the corrected low energy response Q_{low}^{corr} by multiplying $[Q_{low}/Q_{high}]^{corr}$ by Q_{high}^{corr}.

58. (New) The system according to claim 57, wherein the electromagnetic radiation comprises x-rays.

59. (New) The system according to claim 57, wherein each of the responses (Q) is one of:

an intensity (I);

a transmittance (T) derived from intensity as a ratio between intensity resulting from measuring an object and a reference intensity;

an absorbance, A, being defined as the negative logarithm to a transmittance, T, (A=-log(T)); and

a reflectance (R) expressing the reflectance from the surface of an object, the reflectance (R) being linearized using the Kubelka-Munk transform (K/S=(1-R)/2R).

60. (New) The system according to claim 52, further comprising:

a storage unit configured to store at least one of: a set of responses (Q_{low}^m and Q_{high}^m) for the set of stable objects measured on the master instrument, the first set of correction coefficients (B_0; B_1, B_2 . . .), and the further correcting function.

61. (New) A set comprising one or more stable objects for, or used during, carrying out a method according to claim 1, each object comprising at least two different chemical compositions which are substantially stable, and each stable object having a response property.

62. (New) The set of stable objects according to claim 61, wherein the response property is absorbance.

63. (New) The set of stable objects according to claim 61, wherein for each of the stable objects a first member of the at least two different chemical compositions is one having X-ray response properties similar to adipose tissue, and a second member of the at least two different chemical compositions is one having X-ray response properties similar to muscle tissue.

64. (New) The set of stable objects according to claim 63, wherein the response properties of the first and second members are absorbance.

65. (New) The set of stable objects according to claim 61, which the stable objects have varying thickness and/or areal density.

66. (New) The set of stable objects according to claim 65, wherein the stable objects are integrated into a single stepped item.

67. (New) The set of stable objects according to claim 61, wherein each object comprised in the set of objects is stable such that the X-ray response properties of the object do not change more than 0.1 % over a prescribed period of at least 10 days.

68. (New) The set of stable objects according to claim 66, wherein the prescribed period is at least 1 month.

69. (New) The set of stable objects according to claim 66, wherein the prescribed period is at least 1 year.

70. (New) The set of stable objects according to claim 66, wherein the X-ray response properties of the object do not change more than more than 0.01 % over the prescribed period.

71. (New) The set of stable objects according to claim 66, wherein the X-ray response properties of the object do not change more than more than 0.001 % over the prescribed period.

72. (New) The set of stable objects according to claim 61, wherein the number of stable objects in the set of stable objects is at least 8.

73. (New) The set of stable objects according to claim 72, wherein the number of stable objects in the set of stable objects is at least 12.

74. (New) The set of stable objects according to claim 72, wherein the number of stable objects in the set of stable objects is at least 15.

75. (New) The set of stable objects according to claim 72, wherein the number of stable objects in the set of stable objects is at least 20.

76. (New) The set of stable objects according to claim 72, wherein the number of stable objects in the set of stable objects is at least 26.